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10/018,727	08/09/2002	Colin Robert Willis	41577/266144	5079

7590

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EXAMINER

PADGETT, MARIANNE L

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/018,727

Applicant(s)

WILLIS ET AL.

Examiner

Marianne L. Padgett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 8/9/02, 3/8/02, 11/4/02 & 9/20/04.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) 8 and 13-20 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-7 and 9-12 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☒ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/8/02, 11/4/02.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

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1. Applicant's election without traverse of Group I method claims 1-7 and 9-12 in the reply filed on 9/20/04 is acknowledged.
2. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9-10, it is unclear to the examiner who is not an organic chemist, what is intended by "further comprises derivatization of the epoxy groups..." (in claim 9, and analogous language in 10). Does this mean that the formula required to be use, are NOT being used, but instead a derivative thereof? If so these claims contradict requirements of claim 1, to use an epoxy of the form of formula (I) or (I A). If not, the claim does not indicate when the derivatization might otherwise occur or what the compound might look like or be, so that its scope is unclear and cannot be properly examined. If process sequence as in claim 12 is intended context is lacking as written. Note in claim 9 "suitably with..." is not a positive limitation, just a non-necessary possibility.

In claim 11, what is "the surface" being referred to, and when is the step done? None of claims 1, 9 or 10 introduce any surface. Is the intent to react with plasma deposited epoxy material that has previously been deposited on the substrate? If so, it has not been clearly or positively claimed.

In claim 1, the metes and bounds of  $R^1$ ,  $R^{1a}$  and  $R^2$  are ambiguous and undefined, because it is unclear if for  $R^1$  or  $R^{1a}$  if only the hydrocarbonyl or if also the heterocyclic group may be substituted, and  $R^2$  is analogously ambiguous for straight or branched options. The term "optionally substituted" is undefined as to what the possible options might be. As written the

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possibilities are unlimited, however the specification does not appear to be commensurate a scope, as p. 4, lines 7-11 limit the substituents to halo groups, or more generally to a relative description dependant on lack of effect during the process.

Claim 12 uses inconsistent terminology, as line 1 introduces “a nucleophilic reagent”, but line 5 (and 6) refers to “said nucleophilic agent” (emphasis added), which is a different term and cannot properly refer back to “reagent”. For clarity applicant needs to use consistent terms.

3. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for substitution in R-group by halo-groups, does not reasonably provide enablement for unlimited types of substitution as presently claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. See above discussion. It is also noted that the constituent groups were also described on p. 4 as being “substantially inert during the process of the invention”, but this concept would only be useful if non-relative or more precisely defined language with respect to what process feature was employed.

4. The disclosure is objected to because of the following informalities: Having 2 separately numbered groups of drawing, i.e. figures 1-9 and scheme 1-3, is inappropriate for U.S. patents, and the description therefore need correcting (as well as the drawings).

Appropriate correction is required.

5. The drawings are objected to because the same number cannot be used for multiple drawings. Both reaction schemes and groups of data are figures or drawings, and need to be given distinct numberings as labels. Corrected drawing sheets in compliance with 37 CFR

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1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. In the scanned file, a copy of WO/00/78469 and if UK 9914185.5 (6/18/99) were found, but no copy of the other foreign priority document UK 0001514.9 dated 1/25/2000 approved to have been scanned.

7. Concerning the scope of the claims as written, it is noted the method of applying the claimed coatings containing the claimed epoxy reads on plasma deposition processes employing compounds of the claimed formula or those where the epoxy has already been deposited (such as a solution thereof, etc.), which is then plasma treated in a post-deposition process, because "in the presence of ..." does not specify the state or location with respect to the substrate, when the plasma is applied.

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8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Connell et al (UK 1,037,144).

In Connell et al, see Fig. 1, p. 2, lines 26-53 and 87-128+ for plasma apparatus and parameters used in the plasma polymerization process, and see p. 2, lines 66-72 for a variety of monomers that includes epoxies, such as glycidyl methacrylate (line 70), which according to the PCT examination reads on these claims. From the structure of glycidyl acrylate (p. 569 of Hawley's Cond. Chem. Dictionary, 12<sup>th</sup> ed), it is clear that the analogous methacrylate

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compound corresponds to applicant's formula (I), where  $R_1 = \text{CH}_3\text{CH}=\text{CH}$  ;  $Y = \text{O}$ ;  $R^2 = -\text{CH}^2-$ , thus confirming the PCT evaluation.

10. Claims 5-7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Connell et al, in view of Timmons et al (5,876,753) or visa versa.

While Connell et al teach plasma polymerization of claimed monomers, they do not discuss use of pulsed plasma and parameters associated therewith, nor derivatization of the (presumably) plasma deposited epoxy coating as in claims 9-12.

Timmons et al teach plasma polymerization of monomers using continuous or pulsed plasma, where use of low energy plasma as exemplified by a pulsed plasma of 200 W and on-off duty cycles of 3/5, 3/15, 3/45 and 3/60 ms. Use of such low energies enables the deposited polymer to retain active functional groups that can be employed in a derivation reaction to covalently couple to these groups, which are taught to include various O-containing functionalizations, including epoxy (table on col. 9). The derivatization is said to be a variety of nucleophilic displacement, which may use various amino containing materials that are a subset of the claimed amines. See the abstract; col. 3, lines 45-col. 4, line 38, esp. col. 3, lines 50-55 & 62-col. 4, lines 5, 24 & 30-38; col. 6, lines 15-col. 7, line 45+; col. 8, line 1-6; col. 9, lines 1-32.

While Timmons et al include epoxy-containing monomers in their teachings, exemplified by allyl glycidylether; they do not disclosure compounds of applicant's particularly claimed epoxy formula. Also the particular energy density and on-off time parameter are not explicitly taught.

It would have been obvious to one of ordinary skill in the art to employ the pulsed plasma process in the deposition of Connell et al or the monomer, glycidyl methacrylate, in the process

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of Timmons et al, because in the first case, Timmons teaches the equivalent usage of continuous or pulsed for plasma deposition (abstract), but further provides advantages in energy control due to use of pulsed plasma, that enables further use of the deposits for the claimed derivatization process without further modification. Use of Connell et al's monomer in Timmons et al's process, would have been obvious, as it is consistent with the generic categories of useful compounds taught, capable of providing desired functional groups for the subsequent derivatization reaction, and has been shown to be effectively deposited via plasma polymerization.

It would have been further obvious to one ordinary skill to determine desirable ranges of pulsed plasma parameters for the polymerization reaction via routine experimentation to provide an effectively low power plasma as taught by Timmons et al, especially given their teaching on col. 7-8, that different reaction chambers provide additional variables for determining parameters, and employing taught power, on/off relationships as a guide to power (hence power density) and cycle time determination. Note while Timmons et al provides some exemplary powers, they do not give power density which can not be determined or explicitly compared if plasma volume is not known, but is related to the above routine experimentation to determine parameters.

11. It is noted that FR 2,581,991 to Delfort et al was cited by PCT as a Y reference over claims 9-19, which presumably correspond to like numbered claimed in the present case, and the French reference corresponds EP 0218722 for which the translation was provided. These references appear to be directed to synthesis reaction for preparing unsaturated glycidyl esters (p. 8 translation), where the glycidyl esters appear to be shown further reacting with amine groups



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(p. 9 translation), but do not appear to be related to plasma processing. Given the above discussion in Timmons et al for derivatization of, (epoxy) functionalized polymers, where various amino groups are suggested therefore, applicant's derivatization reaction is suggested as discussed above, however Delfort et al provides cumulative evidence that the amine groups provided to the active epoxy functional groups on the coated surface, would have been expected to proceed in a covalent coupling reaction or derivatization at the site of the epoxy as suggested and claimed, as well as providing further evidence of the known desirability of such reaction products.

12. Claims 1-5 and 9-10 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kolluri et al (5,723,219).

In Kolluri et al., see the abstract; col. 2, lines 35-57+ for prior art plasma polymerization and its limits; col. 3, lines 5-26 for pulsed plasma polymerization to preserve functional groups in deposited films; summary for sequential plasma depositions; col. 5, lines 40-49 for classes of monomer including epoxies, with lines 47-48 teaches allyl glycidyl ether, glycidyl methacrylate (GMA), etc; col. 6, lines 5-30 teaching various amines and lines 60-67 plasma in general; col. 7, table I gives surface functional groups (1<sup>st</sup> plasma deposited layer), and what it reacts with to produce what, where #13 and 14, react amines with epoxy functional groups on the surface; col. 8, line 62-col. 9, line 14, esp. 3 and 10-11 with such suggested combinations; col. 9, 15+ with specific examples noting plasma is pulsed (col. 9, line 50; col. 10 line 52; col. 12, line 56-57, etc); col. 16, line 30-60 and col. 20, line 18-col. 21, line 23 discussing and illustrating first plasma deposition using GMA, then plasma depositing an amine thereon via reaction with the epoxy group; and claims 1, 4-6, etc.

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13. Claims 1-7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Timmons et al (753), in view of Kolluri et al, discussed above in section 10 and 12, respectively.

As noted above Timmons et al teach allyl glycidyl ether (AGE) instead of the claimed epoxy compounds, but Kolluri et al also teaches analogous plasma polymerization reactions, where either AGE or GMA are taught to be deposited for their reactive epoxy functional groups, hence use of GPA in Timmons et al would have been expected to be effective for the taught process due to taught equivalence, providing an alternative species for the generically taught epoxy containing monomers.

14. Other are of interest includes Valiant, Jr. et al (6,630,243 B2) and Chabreck et al (6,436,481 B1) who have related teaching with pulsed plasma, and epoxies such as GMA, although Chabreck et al's 371 date is after one of applicants' UK priority dates. Copending cases to overlapping inventors include Badyal et al (6,551,950 B1 and 6,358,569 B1), which concern plasma polymerization using pulsed plasma.

15. Applicants IDS are made of record, however it is noted that the citation of contents, cover pages, and prefaces of Books, is relatively meaningless, since none of the actual information provided by the book can be reviewed / is present for review.

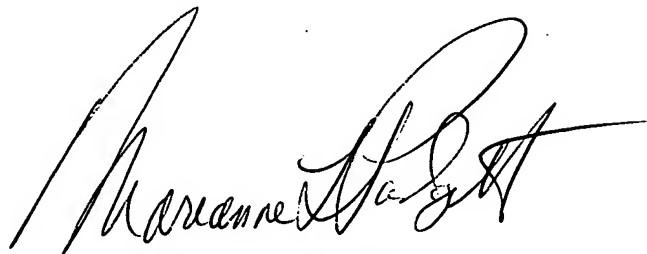
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 am to 4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. L. Padgett/af  
January 5, 2005  
January 11, 2005

A handwritten signature in black ink, appearing to read 'Marianne Padgett', with a large, stylized initial 'P'.

**MARIANNE PADGETT  
PRIMARY EXAMINER**